whether airtime should be counted as part of the money supply, he does not delve into the ancient debates of economists regarding how to measure the money supply.

Instead of ending with predictions, the book ends with a challenge, by pointing out that understanding money is more than just understanding legal tender, but understanding other ways of transferring wealth and all of the attendant social and cultural means of keeping track of credit and debit relationships.

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F International Economics

Global Production: Firms, Contracts, and Trade Structure. By Pol Antràs. CREI Lectures in Macroeconomics series. Princeton and Oxford: Princeton University Press, 2016. Pp. viii, 328. \$49.50. ISBN 978–0–691–16827–2, cloth.

JEL 2016–0619

The author has risen to the status of one of the premier international trade economists in the world largely on the basis of work synthesized in this book. Since this work appeared almost exclusively in the very top journals in the profession, the main role of the reviewer is to assess the value added of the synthesis, rather than the quality of the research. Another role is to gauge the audience. I found substantial value added, but the potential audience is narrower than it could have been.

Firms' input-purchasing decisions are the subject matter of Antràs's book. Do firms purchase their inputs from domestic or foreign suppliers, and do they vertically integrate in either case? Antràs does not try to address the general equilibrium or welfare consequences of these decisions, but lays the groundwork for researchers who choose to do so. His book is thus a perfect illustration of the statement with which he opens chapter 2 (p. 28): "The field of international trade has experienced a true revolution in recent years. Firms rather than countries or industries are now the central unit of analysis."

Chapter 2 continues with a multisector extension of the Melitz (2003) model, then allows production to be broken up into two stages, headquarter services and manufacturing. With two countries, one with higher wages, it is shown that more productive firms in the high-wage country offshore manufacturing production to the low-wage country, which is analogous to the Melitz (2003) result that more productive firms export. The model is then extended to many countries using not-yet-published work by Antràs, Fort, and Tintelnot (2014), and (with additional assumptions) it is shown that more productive firms offshore to more countries. This extension is later applied in chapters 5 and 8.

The remainder of the book is divided into two parts, each consisting of three chapters. Part II, titled "Location," focuses on the effects of contracting problems on the offshoring decision; part III, titled "Internalization," adds the choice between transacting at arm's length and vertical integration.

Chapter 3 is mostly new material for Antràs, but mainly consists of integrating previous empirical studies of the impact of contractual insecurity on bilateral trade with the multisector extension of the Melitz model used in chapter 2. It starts by treating contractual insecurity as similar to additional "melting" of exports, except that the extra amount the exporter has to ship in order for one unit to arrive winds up in the hands of the importer, instead of disappearing. This motivates (pp. 71 and 74) a reproduction of table 5 from Anderson and Marcouiller (2002) and table 2 from Helpman, Melitz, and Rubinstein (2008). Later it is shown that possible opportunism on the exporter side again leads to a "melting" formulation, but with no gain for the importer. This motivates (p. 83) reproduction of results from Berkowitz, Moenius, and Pistor (2006). The chapter ends by reporting the results in Antràs and Foley (forthcoming) that a US exporter of poultry was more likely to demand cash in advance from importing countries with weak contracting institutions.

Chapter 4 is the first really strong chapter in the book, synthesizing Antràs and Helpman

(2004), Antràs and Helpman (2008), and Antràs and Chor (2013). It extends the model where production is broken up into headquarter services and manufacturing to allow for incomplete contracting on relationship-specific investments made by the firm and manufacturer. There is a nice review of reasons to model the offshore contracting environment as "totally incomplete," so that the firm and manufacturer work without a contract and instead rely on their bargaining powers to obtain their shares of the surplus generated by their relationship. The model again essentially yields a "melting" result, but with more microstructure that is explored in the rest of the chapter. Among these various explorations is a clever one to "partial contractibility," where headquarter services and manufacturing are themselves broken up into contractible and noncontractible components, and another clever one to "partial relationship specificity," where the holdup problem is alleviated by imperfect secondary markets for the inputs supplied by the firm and manufacturer. These methods of overcoming the all-or-nothing quality that characterizes the standard model may be the material in the book that appeals most to the readers interested in organizational economics and applied contract theory that Antràs mentions in his preface (p. vii).

Chapter 5 is largely devoted to empirical tests of the variants of the two-country sourcing model in chapter 4. Antràs uses sector-level US import data, rather than firm-level data, based on the firm-level theory of chapter 4 aggregated to the sectoral level. Nothing is known about the US importing firms, so Antràs uses various strategies to try to focus on imports of intermediates to US-owned firms. Without these strategies, the only significant result in a baseline regression testing the complete contracting model is that the import share of US absorption is negatively associated with freight costs. Adding these strategies produces more interesting, but not very robust, results. Antràs then uses the results on incomplete contracting from chapter 4 to motivate introduction of industry-level measures of contractibility devised by Nunn (2007), Levchenko (2007), and others. He states (p. 151) that the results "provide no evidence in support of our contracting models of global sourcing."

Antràs then develops a theoretical rationale for considering certain interactions of country characteristics with industry characteristics as determinants of the import share of US absorption. The effect is to justify specifications much closer to Nunn (2007), Levchenko (2007), and others. Antràs ends the chapter with regressions of the log of this share (effectively, the log of US imports, attempting to filter for inputs and US-owned importers) on various industry–country interaction terms controlling for country–year and industry fixed effects. Interactions of the Nunn measure of input specificity with country rule of law, a proxy for headquarter intensity with country rule of law, and this proxy with the credit/GDP ratio all have robust positive associations with the log of US imports (as filtered by Antràs).

I find it difficult to evaluate chapter 5. Is it a comprehensive and honest attempt to empirically assess the theories developed in chapter 4, or is it a "search for stars"? It is impressive and admirable that Antràs provides the code and data sets needed to replicate the empirical results in this chapter. One of the main impressions left by the chapter is that testing some of the more subtle implications of offshoring theory is hampered by the difficulty of measuring certain key theoretical parameters. As Antràs states (p. 165), "A critical challenge in the empirical analyses performed in this chapter is that the key industry characteristics (specificity, input substitutability, demand elasticities, headquarter intensity, and so on) that shape the differential effect of contract enforcement on the profitability of offshoring across sectors are particularly hard to measure in the data."

Chapter 6, the first chapter of part III on internalization, begins with a very nice non-technical overview of the transaction cost theory of the firm. It then boils this theory down to a tradeoff between the frictions from relationship-specific investments modeled in chapter 4 and the higher marginal costs and fixed costs assumed to result from vertical integration. When operating in foreign markets, the higher marginal costs are assumed to be less than what results from transaction costs, so more productive firms that can amortize the higher fixed costs over more output choose vertical integration within the foreign market—that is, foreign direct investment (FDI). Antràs's model then determines the intrafirm

share of imported intermediates. Parameter changes that induce firms to switch from domestic to foreign production reduce this share since these are less productive firms that switch to arm's length foreign production.

Chapter 7 is another very strong chapter, in which Antràs no longer assumes that internalization eliminates the contracting frictions caused by relationship-specific investments, instead adopting the property rights approach to internalization (Grossman and Hart 1986, Hart and Moore 1990). He derives the result that the profitability of vertical integration (firm owns manufacturer) relative to outsourcing increases with the headquarter intensity of production, consistent with the standard property rights result that ownership rights of assets should be allocated to the party undertaking noncontractible investments that contributes more to the value of the relationship. If headquarter intensity is sufficiently high, the most productive firms choose FDI over foreign outsourcing, as in chapter 6. Again, the results are used to predict the intrafirm share of imported intermediates. The extensions of these benchmark results run parallel to the extensions in chapter 4: financial constraints on manufacturers, partial contractibility, partial relationship specificity, multiple inputs and multilateral contracting, and sequential production. The extended results differ from the transactions cost model predictions in interesting ways that highlight the subtlety of the property rights theory. For example, increases in contractibility reduce the intrafirm share of imported intermediates using the transactions cost model regardless of whether it is contractibility of headquarter or manufacturing services, but increases in contractibility of manufacturing services *increase* the intrafirm import share using the property rights model because the manufacturer's contribution to the value of noncontractible investments is decreased.

The concluding chapter begins with a reminder that, when testing theories of internalization, international trade data have an advantage over domestic data because customs records all imported input purchases but not domestic input purchases. Antràs relies heavily on the US Related-Party Trade database, which is at the product level rather than the product–firm level. Regressions show measures of headquarter intensity, especially R&D/sales and capital equipment/labor, to be positively correlated with the intrafirm import share. They also show freight costs to be negatively correlated with the intrafirm import share, which contradicts the prediction that the intrafirm import share should increase because more firms of intermediate productivity sort into domestic sourcing. These results are robust to refinements similar to those implemented in chapter 5, such as filtering out final goods industries to focus on intermediates. The next section of the chapter is spent in a rather strained attempt to distinguish whether the transaction cost or property rights theory of the firm, as described in chapters 6 and 7, respectively, is more supported by the data. Some space is also devoted to the impacts of interactions of industry with country characteristics on intrafirm imports, with little in the way of conclusive results. The chapter ends with suggestions for how more informative results might be obtained in the future, and mentions that how organizational decisions of multinational firms affect labor markets, product markets, and social welfare could be explored in the future using structural estimation techniques.

Who should read this book? In his preface (p. vii), Antràs writes, "I have attempted, however, to make the style of the book less terse than is standard in professional journals and graduate-level textbooks. This may alienate some technically oriented readers . . . ." In fact, technically oriented readers have nothing to fear. Let us crudely measure technical content by counting numbered equations. Chapters 2–8 average twenty numbered equations each. For comparison, consider the oldest and newest papers written by Antràs on which he draws for the book: Antràs (2003) has twenty-five numbered equations; Antràs, Fort, and Tintelnot (2014) has twenty-two. One wonders whether it would have been possible to adopt the style of Antràs (2005), which has only seven numbered equations and is far more accessible than any of the theory chapters in this book.

In addition to this stylistic issue, there is a substantive point concerning audience. Part III (chapters 6–8) on "internalization" can also be thought of as addressing the determinants of vertical FDI. This could have been an opportunity

to engage with the broader FDI literature and ask whether the insights provided by Antràs's analysis can be applied to "horizontal" FDI, meaning subsidiaries of multinational enterprises that supply their host markets, rather than supplying inputs to headquarters. The "knowledge capital" approach used by Markusen (1995) and others to understand horizontal FDI also identifies incomplete contracts as a cause of internalization, but places more emphasis on the problems encountered in licensing the proprietary knowledge of headquarters to competitors in the host country. A careful discussion by Antràs of whether and how his models could be adapted to study these problems could have been very informative.

In sum, Antràs may have missed opportunities to reach an audience that is broader than, or different from, the audience for the original articles on which his book is based. For those working in the area, however, *Global Production* is a must-read. I have already incorporated some of the material on contracting into my graduate course. I can think of no stronger endorsement.

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J Labor and Demographic Economics

Guild-Ridden Labor Markets: The Curious Case of Occupational Licensing. By Morris M. Kleiner. WE Focus Series. Kalamazoo: W. E. Upjohn Institute for Employment Research, 2015. Pp. vii, 117. $14.99. ISBN 978–0–88099–501–6, pbk. *JEL 2016–0245*

All professions are conspiracies against the laity.
—George Bernard Shaw (1906)

Labor economist Morris M. Kleiner begins the last chapter of his book, *Guild-Ridden Labor Markets* with this epigraph, no less true now than a century ago. Kleiner's compact volume expertly and efficiently explains the rise of this conspiracy, which he calls "the curious case of occupational licensing," and its effects on consumers, labor markets, and professionals. The upshot is gloomy: professional licensing tends to restrict professional entry and mobility, raise prices to consumers, and provide little benefit in the way of better or safer professional service. This book is a must-read, not only for labor economists and